

TACIR

The Tennessee Advisory Commission
on Intergovernmental Relations



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MEMORANDUM

TO: TACIR Commission Members

FROM: Harry A. Green *Harry*
Executive Director

DATE: June 12, 2008

SUBJECT: Running on Empty: Facing the Challenges of Rising Gas Prices
and Diminishing Oil Supplies

During the 1970's, Lester Brown of the World Watch Institute wrote a book entitled, *Running on Empty*. One observation that he made is that America's economic system and urban sprawl was designed to run on \$2 a barrel oil and hence found it must be redesigned to run on \$40 a barrel of oil. Since oil is now over \$135 a barrel, re-designing our system must be given serious attention.

Many geologists believe that the world supply of oil has "peaked," at a time when world-wide demand is at an all-time high. One development that is clearly different from the 1970s, is that China and India—two major growth economies—are oil dependent. They are competing for oil against other oil dependent countries including the United States, Great Britain, Germany, France, Spain, and Japan.

These facts and conditions clearly suggest that the United States must make significant and permanent adjustments in oil-consumption behavior. Nearly 67 percent of oil consumption is for the transportation sector and around 230 million privately owned vehicles. The consumption pattern of the past 60 years is clearly not sustainable without an energy magic bullet. What do we need to know?

Who Owns the World's Oil?

Five of the six nations with the largest proved oil reserves are in the Middle East:

	(Billion Barrels)	
Saudi Arabia	267	20.6 %
Iran	133	10.2
Iraq	115	8.9
Kuwait	104	8.0
United Arab Emirates	98	7.6
		<hr/> 55.3 %
Exhibit:		
Canada	178.8	13.8 %
Total		<hr/> 69.1 %

Rounding out the top ten nations are: Venezuela (6.2%); Russia (4.6%); Libya (3.0%); and Nigeria (2.8%). These ten nations own nearly 86% of the proved oil reserves in the world.

The following table shows the major oil providers to the United States:

Major Providers of Oil to U.S.

(Thousands of Barrels per Day)

Canada	2,131	18.4 %
Mexico	1,498	12.9
Saudi Arabia	1,449	12.5
Venezuela	1,395	12.0
Nigeria	1,154	10.0
Algeria	628	5.4
Iraq	551	4.8
Angola	532	4.6
Russia	360	3.1
Virgin Islands	322	2.9
Total	<hr/> 10,020	<hr/> 86.6 %
All Others	1,557	13.4 %
Total	<hr/> 11,577	<hr/> 100.0 %

Source: U.S. Energy Information Administration

Based on information from the Energy Information Administration, the US provided 41.8% of its own oil in 2007.

New International Competition for Oil

The newest contenders in the global oil markets are China and India. By far the greatest new consumer, China produced most of the oil it needed in the 1980s. No

more. Some estimates are that China's oil imports have increased 6 times in the past decade. This huge increase in China's oil consumption has greatly contributed to record high oil prices. Ironically, by "out sourcing" significant manufacturing to China, American corporations have contributed to these unprecedented demands for crude and refined petroleum in China.

Twenty-one nations that are "mostly un-free" or "politically repressed" own nearly 45 percent of the world's proven oil supply. Given the evolving geopolitical geography of oil supply, many leaders of OPEC and other oil providing nations believe that they will have difficulty providing more than 100 billion barrels a day. On the other hand, Exxon-Mobil believes that, given better access to oil reserves, the international oil industry will be able to produce 116 billion barrels a day in 2030. Similarly, the Energy Information Administration forecasts that, depending on continuing investments, the world can produce 118 million barrels a day by 2030.

Top 25 Oil Producing Countries

Country	Barrels Per Day <i>(millions)</i>
Saudi Arabia	11.0
Russia	9.9
United States	8.3
Iran	4.2
Mexico	3.8
China	3.7
Canada	3.1
Norway	3.0
European Union	2.9
Venezuela	2.8
Kuwait	2.7
United Arab Emirates	2.5
Nigeria	2.4
Iraq	2.1
Algeria	2.1
United Kingdom	1.9
Libia	1.7
Brazil	1.6
Kazakhstan	1.4
Angola	1.3
Qatar	1.1

Source: CIA - The World Factbook.

<http://www.cia.gov/library/publications/the-world-factbook/rankorder/2173.rank.html>. May 15, 2008.

What Drives Gasoline Prices?

Gas prices are driven by a number of factors. Crude oil price is the single most important factor that drives gas prices. However, gas prices are also influenced by:

- movements in consumption,
- refinery issues,
- existing inventories, and
- market speculation.

Political events can also affect gas prices. Political and military unrest in the world drives uncertainty about supply availability. Uncertainty tends to drive up gasoline prices. Spot markets (near-term) and future markets (delivery on a specific date) are particularly influenced by civil and military unrest. Military and political events that have affected gas prices include the

- Arab oil embargo in the mid 1970s,
- Iranian Revolution (1979),
- Iran-Iraq War (1980-1988),
- disruption of Kuwait oil resources caused by Iraq invasion (1990-1991),
- the first U.S.-Iraq War (1991), and
- the second U.S.-Iraq War (2003-present).

The price of gasoline can be affected by seasonal issues such as vacation time and holidays. Most gasoline use in the United States is by passenger automobiles (Memorial Day – Labor Day). The winter shift from gasoline to heating oil can also affect gas prices. Prolonged cold weather affects the timing of the switch from heating oil to gasoline oil and increased demand drives up gasoline prices

Natural events affect gasoline prices as well. Hurricanes Katrina and Rita closed down at least 25 percent of United States refinery capacity in 2005 causing a rise in gas prices.

Some Interesting Facts About Oil

- Americans waste more than 2 billion gallons of fuel idling in traffic jams each year.
- The Council on Foreign Relations in *National Security Consequences of U.S. Oil Dependency* warns that the U.S. needs a strong military presence in key oil producing areas of the world. Thus, the Iraq War was driven in part by the need to maintain oil stability in world markets.

- Alternative fuels are ethanol; biodiesel; coal; natural gas; and oil shale—which bring a host of expensive problems, including environmental degradation.
- A \$500 million grant has been given to the University of California at Berkeley by BP Alternative Energy to create an Energy Biosciences Institute.
- All major oil companies are interested in investing in “tar sands” found principally in Alberta Province of Canada. Tar sand can be converted into synthetic petroleum but it is very expensive and environmentally destructive (the same is true for the mining of shale oil in the Green River Basin of western Colorado, eastern Utah, and southern Wyoming.)

Challenges to State and Local Governments

The rising real cost of oil and other energy sources will have a profound fiscal impact on state and local governments in the U.S. It is already affecting Tennessee’s local governments:

- The Blount County Sheriff’s Office and Maryville Police Department ran out of gas money in April. Money had to be pulled from other areas of the budget to pay for fuel.
- The Sumner County Emergency Medical Services used up all but \$3,500 of its fuel budget four months before the end of its fiscal year.
- In Fairview, the blue lights were removed from the tops of the police cars to improve mileage.
- In Montgomery County, police officers began taking police reports over the phone on non-emergency calls in order to save gas.
- The Williamson County School Board asked the County Commission to let them dip into the schools’ fund balance for \$250,000 to pay for fuel.
- Local school systems are considering raising meal prices due to the rise in food costs (due to higher energy prices).

The TACIR staff plans to study the effect of high fuel prices on the state and local governments over the next year and identify new ways in which Tennessee and its local governments can address the challenge of high gas prices. You will find included in this tab:

- Charts showing the rise in gas and diesel prices in FY 2007 and FY 2008 and
- The Executive Summary from the book *Post Carbon Cities: Planning for Energy and Climate Uncertainty*.

Other available references:

- The Summary from the Congressional Budget Office paper *China's Growing Demand for Oil and Its Impact on US Petroleum Markets*;
- A copy of the report *Major US City Preparedness for an Oil Crisis*;
- A summary of Chapter 2 Beyond the Oil Peak from the book *Plan B 2.0: Rescuing a Planet Under Stress and a Civilization in Trouble*;
- A summary of the presentation given by Matthew Simmons at the 2006 World Oil Conference of The Association for the Study of Peak Oil and Gas (ASPO) entitled "The 51st State: Peak Oil Denial";
- A copy of a televised speech delivered by President Jimmy Carter on April 18, 1977 regarding his proposed energy policy; and
- Seven *Wall Street Journal* articles on fuel issues.

National Petroleum Council (NPC)

In a recent report, *Facing the Hard Truths About Energy*, (a comprehensive view of 2030 of global oil and natural gas), the NPC warns that global demand will grow by 50%-60% by 2030.

The Council proposes 5 core strategies for the United States to meet this challenge:

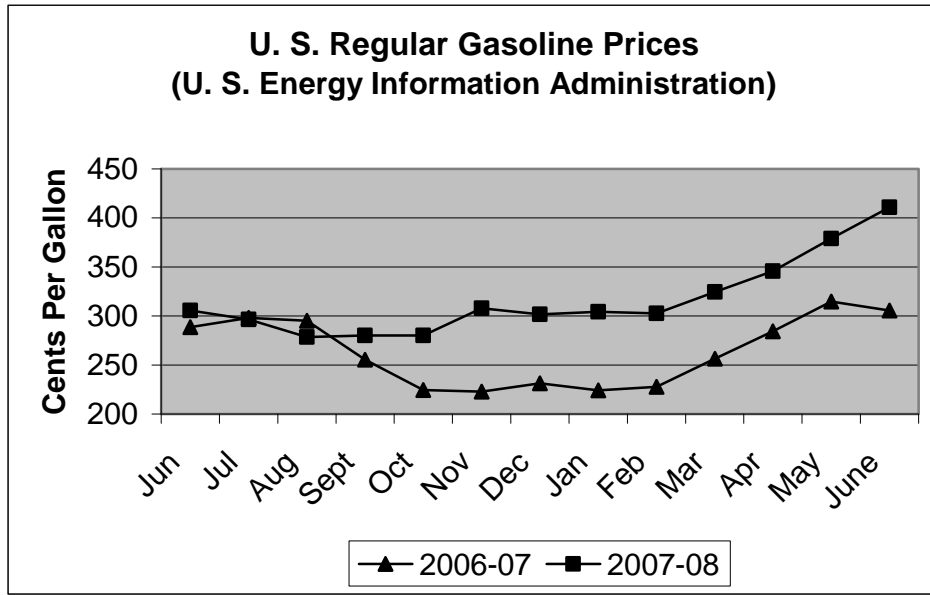
- Moderate the growing demand for energy by increasing efficiency of transportation, residential, commercial, and industrial uses.
- Expand and diversify production from clean coal, nuclear, biomass, other renewables, and unconventional oil and gas; moderate the decline of

conventional domestic oil and gas production; and increase access for development of new resources.

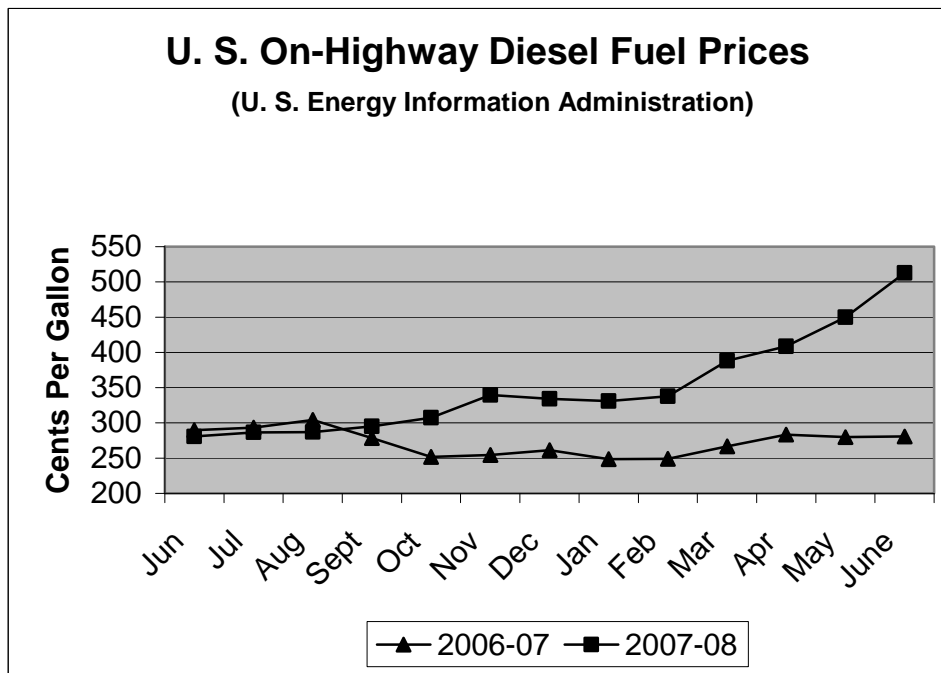
- Integrate energy policy into trade, economic, environmental, security, and foreign policies; strengthen global energy trade and investment; and broaden dialogue with both producing and consuming nations to improve global energy security.
- Enhance science and engineering capabilities and create long-term opportunities for research and development in all phases of the energy supply and demand system.
- Develop the legal and regulatory framework to enable carbon capture and sequestration. In addition, as policymakers consider options to reduce carbon dioxide emissions, provide an effective global framework for carbon management, including establishment of a transparent, predictable, economy-wide cost for carbon dioxide emissions.

Charts Showing Rise in Gas and Diesel Prices FY 2007 and FY 2008

Rise in Gas Prices in FY 2007 and FY 2008



Rise in Diesel Prices in FY 2007 and FY 2008



Post Carbon Cities: Planning for Energy and Climate Uncertainty

A Guidebook on Peak Oil and Global Warming for Local Governments

By Daniel Lerch, Post Carbon Institute

Executive Summary

Post Carbon Cities: Planning for Energy and Climate Uncertainty provides guidance and support to local government officials and staff for meeting three critical goals:

- breaking community dependence on oil,
- stopping community contributions to global warming, and
- preparing the community to thrive in a time of energy and climate uncertainty.

The most direct strategy for achieving these goals is to reduce consumption and produce locally: reduce the community's overall consumption, and develop the capacity of local farmers and manufacturers to provide for the community's basic needs. The more your community can get its energy and basic goods from local sources, the less vulnerable it will be to rising and unstable oil prices, and the less it will contribute to climate change.

Energy and climate uncertainty

Most credible observers now recognize that our global climate faces radical change in the coming decades if we do not take immediate and far-reaching action. Peak oil (the coming high point and subsequent decline of world oil production) is not as widely understood, but presents a similarly complex set of challenges.

Time is short to prepare for peak oil and global warming. At current rates of fossil fuel consumption we will most likely pass peak oil by 2010*, and we seriously risk widespread, catastrophic climate change if we do not begin dramatically reducing global carbon emissions.

The key problem posed by both peak oil and global warming is ultimately one of **uncertainty**: these phenomena are creating changes in economies and ecosystems

Source: Lerch, Daniel. 2007. *Post Carbon Cities: Planning for Energy and Climate Uncertainty*. Portland: Post Carbon Press.

at the global, regional and even local levels that we cannot easily predict. For local governments -responsible for managing local public services, planning for future land use and transportation, and protecting the community's economic and social health- this uncertainty creates a wide variety of risks and vulnerabilities. How will local economies be affected when the price of oil exceeds \$200 a barrel? How will regional climate shifts affect the local water supply? Local government decision makers need to understand and respond to these challenges.

Incentives to act locally

As many southeastern U.S. municipalities discovered after Hurricane Katrina knocked out regional fuel pipelines in 2005, state/provincial and federal government agencies do not have the ability to meet every jurisdiction's resource needs in times of crisis. Local governments, however, have the flexibility, capacity and motivation to address risk management and emergency response needs in ways that higher-level government agencies cannot.

Local governments have strong financial incentives to address peak oil and climate change. Reducing local oil dependence and carbon emissions means pursuing energy-efficient buildings, locally-controlled energy sources, compact transit-oriented land uses, alternative transportation modes and other aims that are energy prudent, and thus ultimately fiscally conservative. When the challenges created by peak oil and climate change are not future risks but present problems, those communities that have prepared will have distinct advantages over those that haven't.

Local governments are well-positioned to address peak oil and climate change because they have influence over three key areas of urban spatial and economic development:

» **Building construction and energy efficiency.** Through zoning codes, building codes and the permitting process, municipalities can encourage building designs that save energy and resources.

» **Local land use and transportation patterns.** Municipal land use and transportation planning decisions directly influence whether people and businesses will have mobility choices that allow them to save energy and

Source: Lerch, Daniel. 2007. *Post Carbon Cities: Planning for Energy and Climate Uncertainty*. Portland: Post Carbon Press.

money.

» **Local economic activity.** Municipal economic development initiatives are opportunities to encourage development in low-energy, zero-carbon directions, by both incentive and example.

What local governments can do

The challenge for local governments is not to predict the future, but to plan for the future using appropriate tools and accurate information. Local governments should take a three-pronged approach to addressing energy and climate uncertainty:

» **Identify local vulnerabilities** based on a careful analysis of the potential impacts of peak oil and global warming on the community.

» **Mitigate local vulnerabilities**, and contribute to national and global efforts to limit the damage from peak oil and climate change.

» **Plan for long-term changes** that cannot be avoided, minimizing the disruptions they will cause and taking advantage of the opportunities they will offer.

Over the last fifteen years, hundreds of local governments in the U.S. and Canada have begun systematically reducing their greenhouse gas emissions in response to global warming. Since 2004, when oil prices climbed beyond 15-year highs, a number of local and regional government agencies in both countries have also begun responding to the threats posed by peak oil.

Drawing from the experiences and examples of these early actors -as well as from consultations with dozens of elected officials, managers, planners, architects, scientists and scholars- here are four initial steps that your own city can take in response to energy and climate uncertainty:

1. Sign the Mayors Climate Protection Agreement (U.S.) and/or endorse the World Mayors and Municipal Leaders Declaration on Climate Change. For U.S. mayors, signing the Agreement commits your city to "meet or

Source: Lerch, Daniel. 2007. *Post Carbon Cities: Planning for Energy and Climate Uncertainty*. Portland: Post Carbon Press.

beat" Kyoto Protocol targets for greenhouse gas reduction, in the absence of federal leadership. Both U.S. and Canadian cities can also contribute to international carbon mitigation efforts by signing the Declaration.

See www.coolmayors.com and www.iclei.org/montrealsummit.

2. Join ICLEI's Cities for Climate Protection Campaign to get your city started on reducing energy use and greenhouse gas emissions, and to connect to the resources and expertise of the leading global movement of local governments working on climate change.

See www.iclei.org.

3. Sign the Oil Depletion Protocol, which sets a target for reducing oil consumption across your community. Signing the Protocol sends a signal to citizens, business leaders and municipal staff that your city is serious about reducing its energy vulnerability. It also makes you part of an international effort to dampen the effects of peak oil.

See www.oildepletionprotocol.org.

4. Establish a Peak Oil Task Force to quickly identify the challenges and vulnerabilities your community faces as a result of peak oil. A task force is also a valuable way to introduce businesses, citizens and other community stakeholders to the challenges of energy uncertainty, and engage them in developing a broad-based community response

See Section 6.2, "Guide to establishing a peak oil task force."



Also drawing from these examples and consultations, here are five principles to integrate into your local government's ongoing decision-making and long-range planning processes:

1. Deal with transportation and land use (or you may as well stop now).

Fundamentally rethink your municipality's land use and transportation practices, from building and zoning codes to long-range planning. Make land use and transportation infrastructure decisions with 100-year timeframes. Organize with neighboring jurisdictions to address the land use and transportation challenges of energy and climate uncertainty at a regional level.

2. Tackle private energy consumption.

Use the tools you already have to encourage serious energy conservation and efficiency in the private sector. Engage the business community aggressively, challenging your local business leaders to reinvent the local economy for the post-carbon world.

3. Attack the problems piece-by-piece and from many angles.

Meet your energy and climate uncertainty response goals with multiple, proven solutions, pursuing many different kinds of solutions at different scales. Enlist the entire community, setting clear community goals and spurring action from all sides to meet them.

Source: Lerch, Daniel. 2007. *Post Carbon Cities: Planning for Energy and Climate Uncertainty*. Portland: Post Carbon Press.

4. Plan for fundamental changes...and make fundamental changes happen.

Educate and involve your fellow elected officials, staff and community stakeholders about the challenges of energy and climate uncertainty, and challenge them to come up with serious solutions. Lead your city's transition by integrating peak oil and climate change considerations in your own decisions.

5. Build a sense of community. In short, do anything you can to get people talking with each other, forming relationships, and investing themselves in the larger community.

Next steps

The Post Carbon Cities network is a resource for everyone who works with or for local governments. Our website at www.postcarboncities.net provides news feeds and special features, resources for policymakers and planners, and a forum where elected officials, municipal staff and others can share and discuss their common problems, challenges, best practices and lessons learned.

We welcome your participation in this dialog; we can all learn much more, much faster, by sharing our successes and our failures, building an ever-richer knowledge base. Please visit us online and join the growing movement of municipal leaders who are preparing their communities for the challenges of energy and climate uncertainty.

ENDNOTES

** According to an increasing number of petroleum analysts, we seem to be facing an undulating plateau of world oil production from 2007 onward, with permanent decline likely underway by 2010. See page 12 of the Guidebook.*

† In 2006 James Hansen, director of NASA's Goddard Institute for Space Studies, publicly called for immediate, broad-based action to reduce carbon emissions, saying "we have a very brief window of opportunity to deal with climate change...no longer than a decade, at the most."

Source: Lerch, Daniel. 2007. *Post Carbon Cities: Planning for Energy and Climate Uncertainty*. Portland: Post Carbon Press.